

Outline

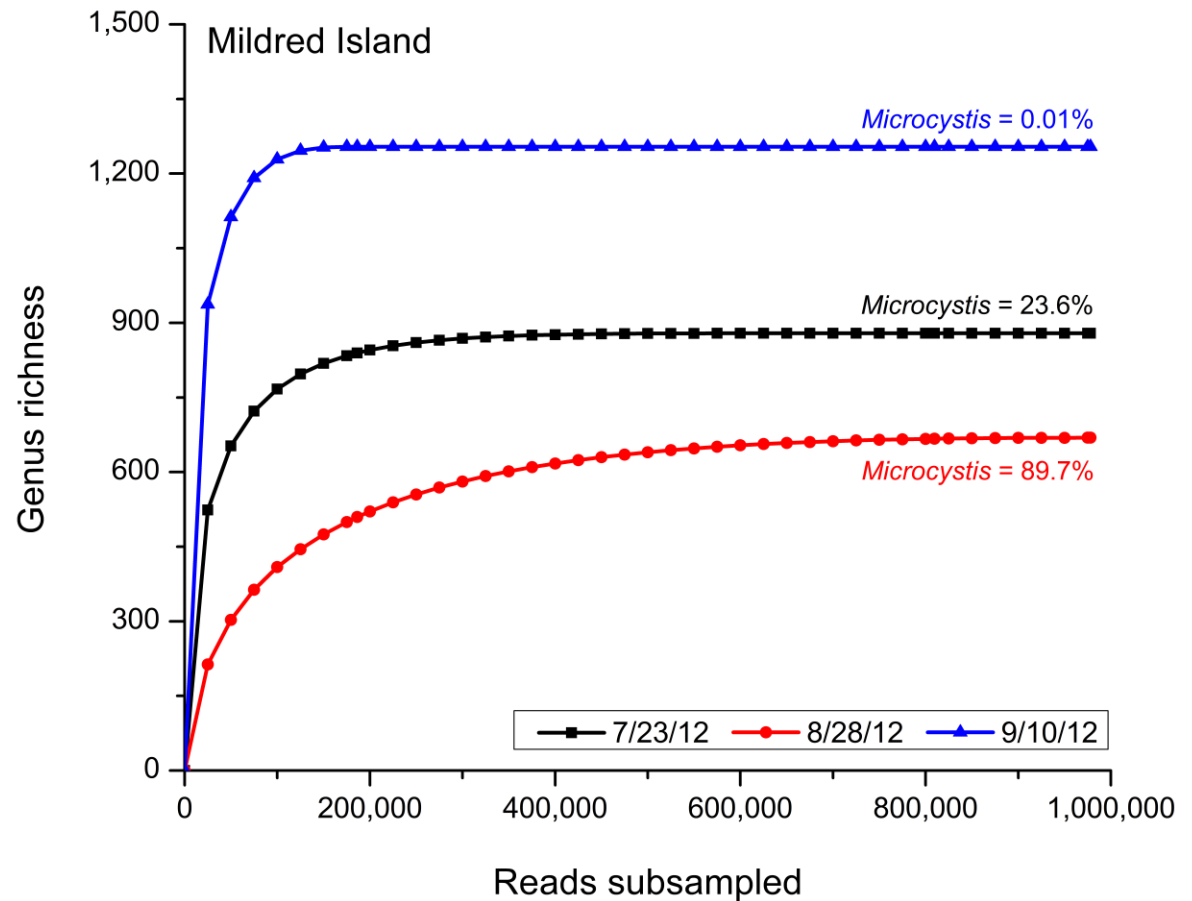
- Illustrations of complexity
- Conflicts and contradictions
- What we have learned

System complexity

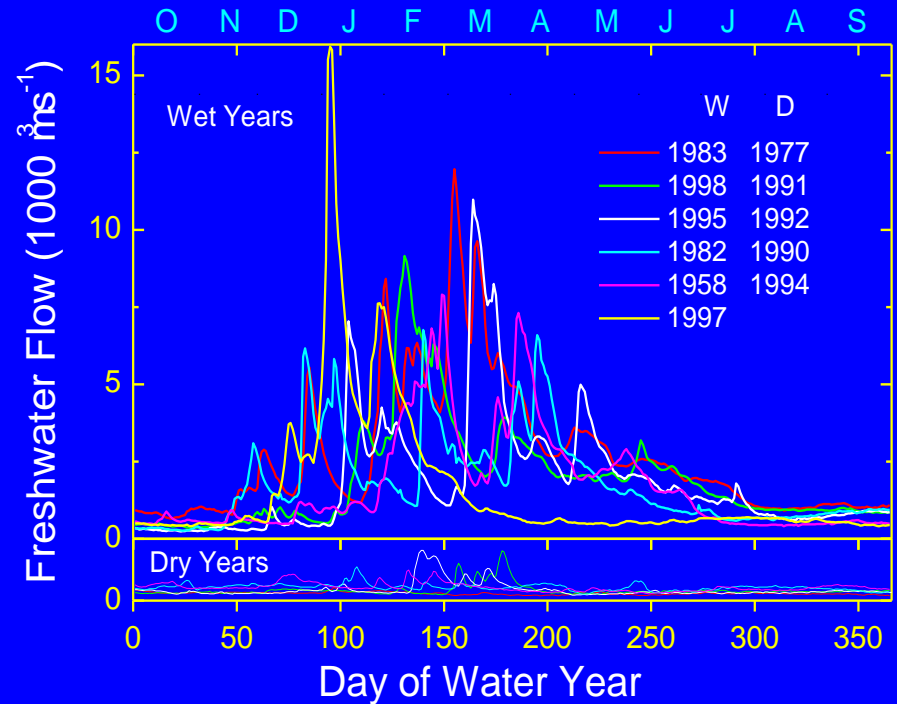
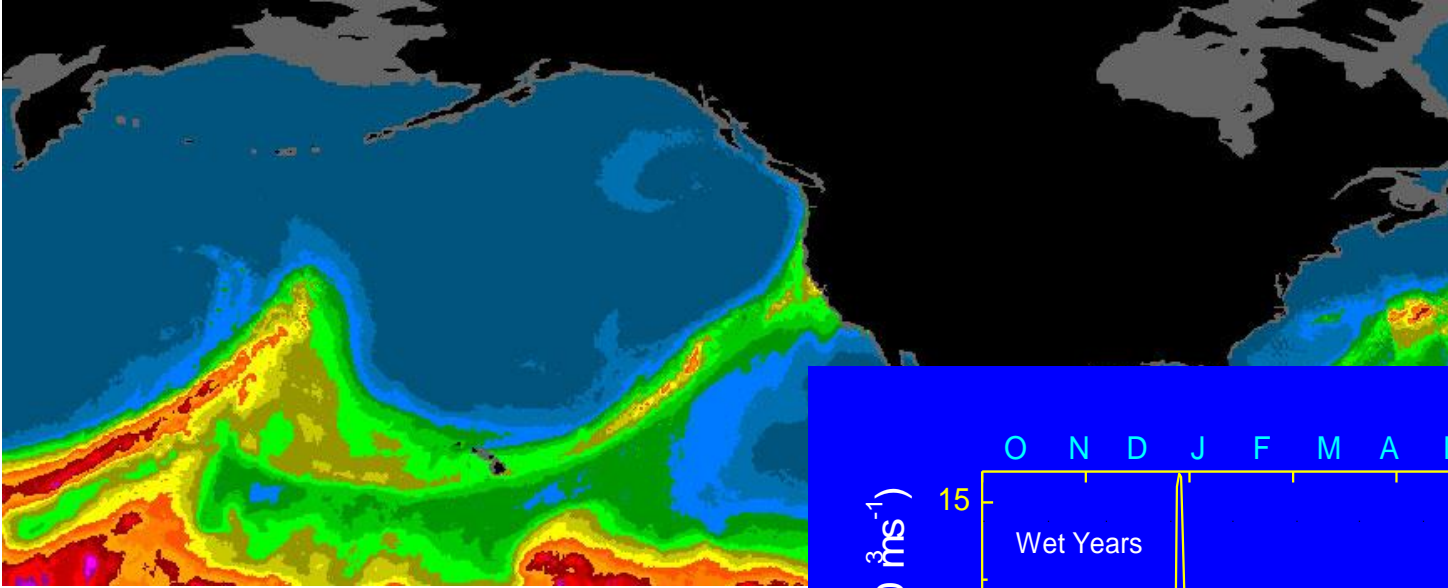
- ~170 fish species, ~70 zooplankton species, etc....

Thousands of
microbes!

Graph courtesy of
Dr. Tim Otten:
www.bendgenetics.com



System complexity



You call **this** complex?

System complexity

Number of species in Delta something like:

40 × 30 × 35 × 50 × 1000!

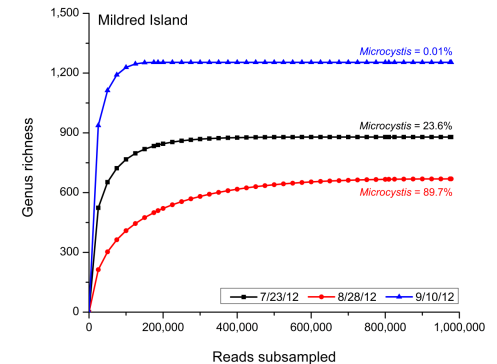
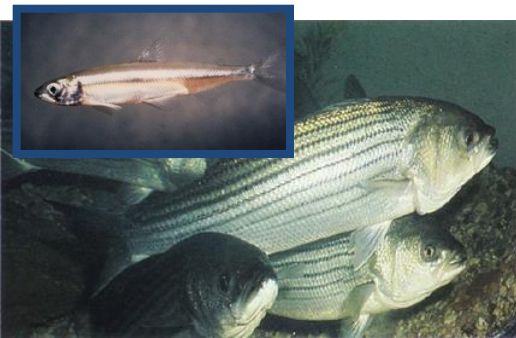
Number of Individuals in Delta something like:

× 10^8

10^{10}

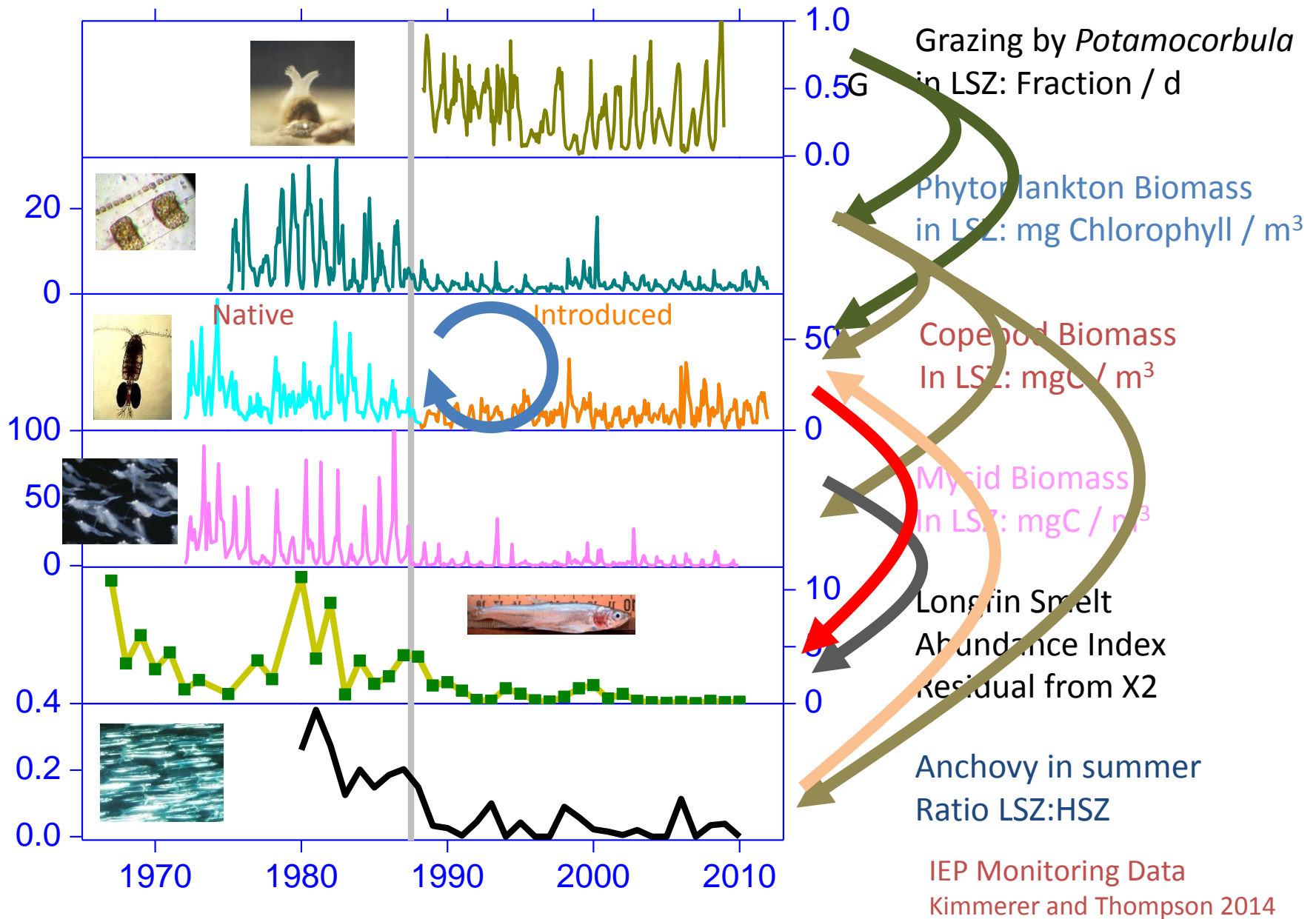
10^{12}

10^{15}



I call **this** complex!!

System complexity: Twisted pathways



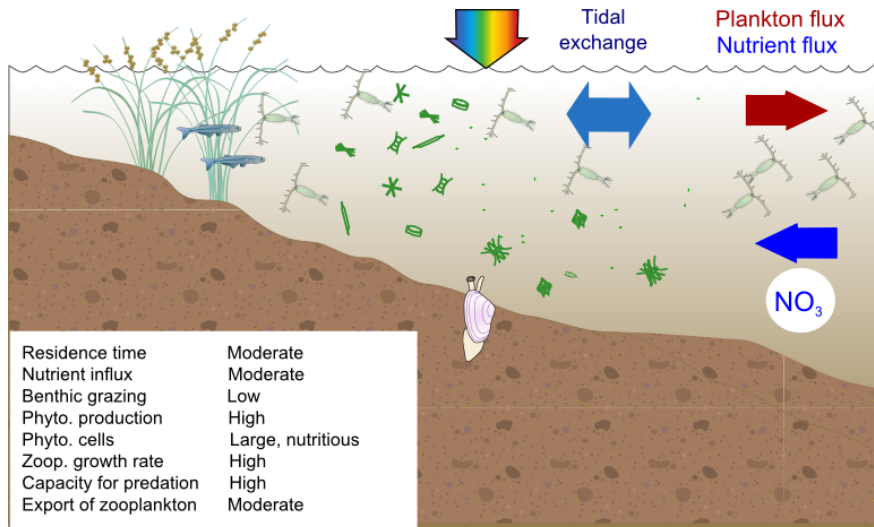
Conflicts and contradictions

Resolving major questions

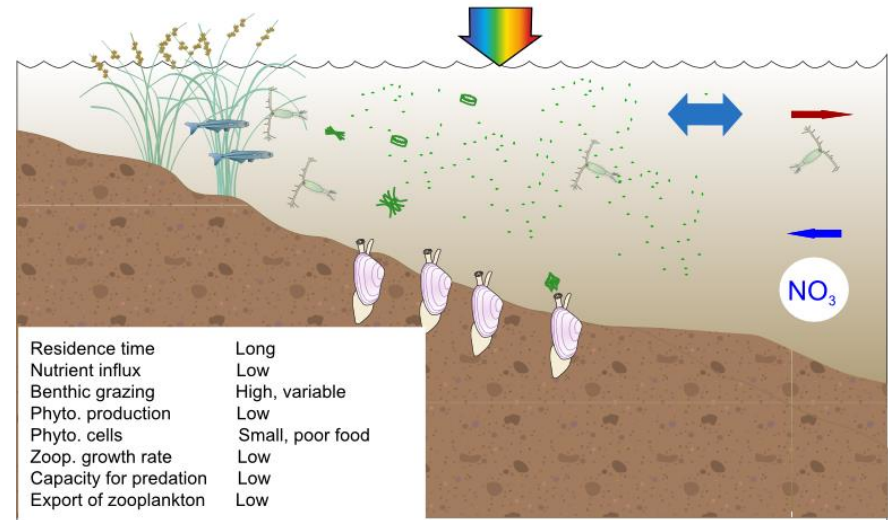
- Effect of pumping on fish populations
- Importance of food limitation
- Moving point of diversion
- Resolving the ammonium question
- Body count inadequate for ecosystem-level questions
- Value of restored marshes to pelagic fish

Shallow habitat: alternative scenarios

High production and export



Low production and export



What we have learned

- A lot!
- Low-salinity habitat better understood
- Some effects of export pumping
- Turbidity effects (except mechanism)
- Expect surprises
- A complex system yields its secrets slowly

Cache Slough 2013 (continued 2015...)

